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10/505,185	09/29/2004	Steffen Riemer	14219-065US1	3712
26161	7590	08/28/2006	EXAMINER	
FISH & RICHARDSON PC			DOUGHERTY, THOMAS M	
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MINNEAPOLIS, MN 55440-1022			2834	

DATE MAILED: 08/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/505,185

Applicant(s)

RIEMER, STEFFEN

Examiner

Thomas M. Dougherty

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 804.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

***Response to Arguments***

Applicant's arguments, filed 8/03/06, with respect to the election/restriction requirement have been fully considered and are persuasive. The election/restriction requirement of 7/10/06 has been withdrawn.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The description of the thickness being "about zero" is indistinct. From the specification it appears that the electrode minima may be torn thereby providing a thickness of zero, however the claim language needs clarification since zero doesn't actually describe thickness rather a lack thereof.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4-6, 8, 9, 18, 19 and 21-25, are rejected under 35 U.S.C. 102(b) as being anticipated by Watabe et al. (JP 4-206786). Watabe et al. shows (figs. 1, 4 and 5) an electrical component comprising a base comprising: ceramic layers (1) and internal electrodes (2) between at least some of the ceramic layers (1); and an external electrode (3) on a face of the base, the external electrode (3) contacting at least some of the internal electrodes (2), the external electrode (3) comprising a layer that has at least one local minimum.

The external electrode (3) comprises areas having a layer thickness that is substantially constant. That is the part of the electrode that is not at the minima.

The ceramic layers (1) are piezoelectrically active. Note the device is an actuator.

The at least one local minimum comprises plural indentations (see fig. 5 especially), the plural indentations being disposed at an angle relative to the face of the base.

The at least one local minimum comprises plural indentations, the plural indentations being spaced apart from one another at substantially equal distances. Again see figure 5.

The at least one local minimum comprises plural indentations, the plural indentations being forming a periodically recurring pattern. See figure 5.

The external electrode (3) has a substantially constant layer thickness at areas other than the at least one local minimum. See figure 5.

Watabe et al. show (figs. 1, 4 and 5) an electrical component comprising: ceramic layers(1), electrodes (2) between at least some of the ceramic layers (1), the ceramic layers (1) and the electrode layers (2) together forming a stack having a first surface and a second surface, the electrode layers (2) comprising alternating first electrodes (2) and second electrodes (also 2), the first electrodes (2) extending to the first surface but not to the second surface, the second electrodes (also 2) extending to the second surface but not to the first surface; and an external electrode (3) on the first surface, the external electrode (3) contacting the first electrodes (2), and the external electrode (3) comprising a layer having one or more local minima.

The stack comprises passive zones adjacent to the first surface and the second surface.

The one or more local minima comprise indentations in the layer comprising the external electrode (3).

By sight, the indentations are at least 25% less thick than a remainder of the layer comprising the external electrode.

The electrical component further comprising one or more wires (6) soldered to the external electrode.

The local minima form troughs that are at an angle relative to the face of the stack, as noted above.

The troughs form substantially regular patterns on the face of the stack as noted above.

Claims 1, 2, 4-6, 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamashita et al. (JP 05335643). Yamashita et al. show (abstract figure) an electrical component comprising a base comprising: ceramic layers ( $3_{a1}$ - $3_{an}$ ) and internal electrodes ( $4_{b1}$ - $4_{bn}$ ) between at least some of the ceramic layers ( $3_{a1}$ - $3_{an}$ ); and an external electrode ( $2_{e1}$ - $2_{e2}$ ) on a face of the base, the external electrode ( $2_{e1}$ - $2_{e2}$ ) contacting at least some of the internal electrodes ( $4_{b1}$ - $4_{bn}$ ), the external electrode ( $2_{e1}$ - $2_{e2}$ ) comprising a layer that has at least one local minimum.

The external electrode ( $2_{e1}$ - $2_{e2}$ ) comprises areas having a layer thickness that is substantially constant. That is the part of the electrode that is not at the minima.

The ceramic layers ( $3_{a1}$ - $3_{an}$ ) are piezoelectrically active. Note the device is an actuator.

The at least one local minimum comprises plural indentations, the plural indentations being disposed at an angle relative to the face of the base. Note that the angle approaches  $90^{\circ}$  caused by the action of  $5_{c1}$ - $5_{c2}$ .

The at least one local minimum comprises plural indentations, the plural indentations being spaced apart from one another at substantially equal distances.

The at least one local minimum comprises plural indentations, the plural indentations being forming a periodically recurring pattern.

The external electrode ( $2_{e1}$ - $2_{e2}$ ) has a substantially constant layer thickness at areas other than the at least one local minimum.

By sight, the at least one local minimum has a maximum of 75% of the substantially constant layer thickness.

As best understood, at the at least one local minimum, the external electrode has a thickness of about zero. Note that the external electrode ( $2_{e1}$ - $2_{e2}$ ) components in Yamashita et al. are similar to those shown by the Applicants in their figures 1 and 2.

Claims 14, 15 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Heinz et al. (US 6,507,140). Heinz shows (figs. 1-3) a method for producing an electrical component comprising: producing a base, the base comprising: ceramic layers, and internal electrodes (2, 3) between at least some of the ceramic layers, a face of the base body comprising an external electrode (7) that contacts at least some internal electrodes (2, 3), the external electrode (7) comprising a layer having at least one local minimum (8); establishing contact between the external electrode (7) and a contact element (6); and exerting a shearing force between the outer external electrode (7) and the face of the base containing the external electrode (7). Note that as these devices are subject to heating a shearing force is applied between components. See col. 3, lines 19-24.

The external electrode and the ceramic layers comprise materials with differing thermal expansion coefficients, again see col. 3, lines 19-24; and wherein soldering is used to establish contact between the external electrode and the contact element, see col. 3, lines 1 and 2.

The shearing force is exerted while contact is being established. Note especially figure 3 where the shearing force may actually cause a separation at 14, therefore it is clear that while the force is in actuation contact must take place.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watabe (JP 4-206786) or Yamashita et al. (JP 05335643) in view of Murata (JP 58-186928). Given the invention of Watabe et al. or Yamashita et al. as noted above, while Watabe et al. note use of copper as a part of their electrode structure however not as a part of their external electrode. Yamashita et al. do not note use of copper specifically in the Abstract.

Murata shows an electrical component comprising a base comprising: ceramic layers (2) and internal electrodes (1) between at least some of the ceramic layers (2); and an external electrode (3) on a face of the base, the external electrode (3) contacting at least some of the internal electrodes.

Murata's external electrode comprises copper. See the title.

Murata does not show the external electrode comprising a layer that has at least one local minimum.

It would have been obvious to one having ordinary skill in the art to design the external electrode of Murata with at least one local minimum as shown by Watabe et al. or Yamashita et al. since such a design as Watabe et al. notes achieves "a piezoelectric actuator having a wide general purpose applicability and being capable of preventing degrading and deterioration of its characteristics" as noted in the PURPOSE.

Alternatively, it would have been obvious to one having ordinary skill in the art to employ copper as a material for the external electrode in the device of Watabe et al. or Yamashita et al. at the time of their inventions, as is shown by Murata, since this is an



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excellent conductive element which is also a strong material, as is indicated by its use by Murata.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watabe (JP 4-206786) or Yamashita et al. (JP 05335643). Given the inventions of either Watabe et al. or Yamashita et al., neither shows the at least one local minimum comprising plural indentations which are distributed substantially uniformly over the outer external electrode.

It would have been obvious to one having ordinary skill in the art to have the at least one local minimum comprise plural indentations distributed substantially uniformly over the outer external electrode since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Claim 12 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Watabe (JP 4-206786) or Yamashita et al. (JP 05335643). Given each invention it is not clear how the external electrode is formed, for example by a screen processing paste containing copper powder. Note however that the method of forming a device is not germane to the issue of patentability of the device itself. *In re Brown* 173 USPQ 685, *in re Fessman* 180 USPQ 324.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watabe (JP 4-206786) or Yamashita et al. (JP 05335643) in view of Murata (JP 8-316095).

Given the invention of Watabe et al. or Yamashita et al. as noted above, the width of their electrodes are not noted.

Murata shows (fig. 1) an electrical component comprising a base comprising: ceramic layers (2) and internal electrodes (3a-3d) between at least some of the ceramic layers (2); and an external electrode (4, 5) on a face of the base, the external electrode (4, 5) contacting at least some of the internal electrodes (2).

Murata teaches that one designs the external electrodes to a desired dimension.

Murata doesn't show the external electrode comprising a layer that has at least one local minimum.

It would have been obvious to one having ordinary skill in the art to arrange the thickness of the external electrode at the minima portions in the devices of either Watabe et al. or Yamashita et al. to have a width of at least 200 $\mu$ m in the following of the teaching of Murata since this is a design choice based on good judgement but not novelty. Additionally it would have been obvious to one having ordinary skill in the art to have a width of at least 200  $\mu$ m since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heinz et al. (US 6,507,140) further in view of Ichinose et al. (JP 57-025798). Given the invention of Heinz et al. as noted above, the outer electrode comprises copper (col. 1, lines 63-64), the ceramic layers comprise a PZT ceramic (see claim 3). They don't show connections from the outside to their external electrodes.

Ichinose et al. show (ABSTRACT figure) an electrical lead soldered to a piezoelectric component wherein the lead is essentially a wire it is soldered to a copper component. See CONSTITUTION.

Ichinose et al. don't show a ceramic layered device with internal electrodes.

It would have been obvious to one having ordinary skill in the art to solder the outer electrode of Heinz et al. to a signal wire, such as is shown by Ichinose et al. since this would allow the device to be driven.

Recitation of a specific heat required to effectively bond the components by solder is a matter of good judgement but not novelty and thus is within the skills of a routineer in the art.

Claim 20, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Watabe et al. (JP 4-206786) in view of Yamashita et al. (JP 05335643). Given the invention of Watabe et al. as noted above, they do not show the one or more local minima having a layer thickness of zero. Given the invention of Yamashita et al. as noted above, it is not clear from the ABSTRACT figure that the first electrodes extend to the first surface but not to the second surface, and the second electrodes extending to the second surface but not to the first surface.

It would have been obvious to one having ordinary skill in the art to have the first electrodes extend to the first surface but not to the second surface, and the second electrodes extending to the second surface but not to the first surface, such as is shown by Watabe et al. in order to prevent undesirable short circuits and "to obtain a

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piezoelectric actuator having a wide general purpose applicability and being capable of preventing degrading and deterioration of its characteristics.

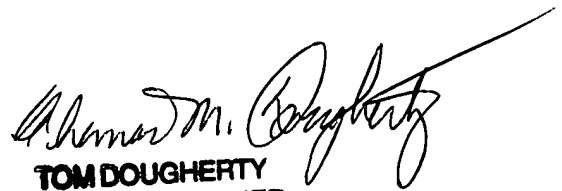
**Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional prior art cited reads on at least some aspects of the claimed invention.

Direct inquiry to Examiner Dougherty at (571) 272-2022.

tmd  
tmd

August 21, 2006

  
**TOM DOUGHERTY**  
**PRIMARY EXAMINER**